

I claim:

1. A laser for optical confinement and feedback, comprising:  
  
a pair of distributed Bragg reflector mirrors surrounding a cavity in a vertical direction (y);  
  
5 a waveguide in the lateral direction (x); and  
  
a distributed feedback grating in a longitudinal direction (z).
2. The laser of claim 1 wherein useful light is extracted using an optical tap, etched or cleaved facet.
3. The laser of claim 1 wherein lateral optical confinement is  
10 achieved using modulation from one of the following means gain/loss modulation, index modulation, effective index modulation, and/or resonant wavelength modulation.
4. A laser of claim 1 wherein said laser comprises a distributed feedback grating in the radial (r) direction rather than a waveguide in the  
15 lateral direction (x) and said distributed feedback grating in said longitudinal direction (z).
5. The laser of claim 4 in which useful light is extracted using an optical tap, etched or cleaved facet.

6. The laser of claim 4 wherein lateral optical confinement is achieved using modulation from one of the following means gain/loss modulation, index modulation, effective index modulation, and/or resonant wavelength modulation.

- 5           7. A device for optical confinement and feedback, comprising:
- a pair of distributed Bragg reflector mirrors surrounding a cavity in the vertical (y) direction;
- a waveguide in the lateral (x) direction; and
- no optical confinement in the longitudinal (z) direction.

- 10          8. The device of claim 7 wherein useful light is extracted using an optical tap, etched or cleaved facet.

          9. The device of claim 7 wherein said device is an active waveguide.

10. The device of claim 7 wherein the device is a combiner, splitter,  
15 or mixer.

          11. The device of claim 7 wherein lateral optical confinement is achieved using modulation from one of the following means gain/loss modulation, index modulation, effective index modulation, and/or resonant wavelength modulation.

12. The device of claim 7 wherein the device is selected to be one of the following group a switch, a filter, a modulator, an amplifier, or a photodetector.

13. A photonic integrated circuit , comprising:

5 a pair of distributed Bragg reflector mirrors surrounding a cavity in a vertical (y) direction,

a waveguide in a lateral (x) direction, and

optical tap means for injecting or extracted light from said waveguide.

14. The photonic integrated circuit of claim 13 wherein component  
10 devices consist of one or more of the following: an active waveguide, a combiner, a splitter, a mixer, a switch, a passive waveguide, a filter, a modulator, an amplifier, a tuning section, a photodetector.

15. The photonic integrated circuit of claim 13 wherein component  
integration is provided by means outside of the plane of the active waveguide  
15 utilizing reflective or diffractive elements.